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MUSIC.

THE insensible, who have not the natural ability to delight in music—the perverted in judgment, who regard it as an emanation of the principle of evil—and even those with whom it is a favourite recreation—are in general alike ignorant or unwitting of its absolute character in nature, and of the providential purpose which it fulfils in the moral world. Music is too apt to appear as a frivolity—as a mere amusement—if not as something like a vice; at the best, it comes before ordinary minds as a thing quite insubstantial, and therefore, in their estimation, entitled to no great respect. But music is in reality a portion, and a very interesting one, of natural philosophy; and when its physical character is inquired into, and considered in connection with our minds, it stands forth in a still more interesting light, as one of those things in nature which are most apt to raise our contemplation to "Nature's God."

Sound, as is generally known, is produced by impulses on the air; and these impulses are usually the result of the vibration or shaking of some substance with which the air is in contact. For instance, a bell is struck by its clapper; the body of the bell consequently vibrates, as we may sensibly assure ourselves by applying our nail lightly to the edge: in its agitation, it beats or makes impulses on the air, which, yielding under the stroke or pressure, is compressed, or condensed, to a small distance around. The compressed air instantly expands, and, in doing so, repeats the pressure on the air next in contact with it; and thus each one of the original strokes of the vibrating metal sends out a series of *shells* of compressed air, somewhat like the waves dispersed over a lake from the dropping of a stone into its placid bosom, and like them always lessening in bulk and force. The air, thus agitated, finally reaches the ear, where it gives a similar impulse to a very fine nervous membrane; and the mind then receives the idea or impression which we call a *sound*.

There is a peculiar character in sounds, depending on the character of the sounding body. A blow with a hammer, or the report of a pistol, produces only a noise, because attended with no great or rapid succession of impulses on the air. But if a body be of such a thinness and tightness as to produce a succession of impulses of a sufficient degree of quickness, a *tone* is the result, namely, a sound composed of a great number of noises, all so close upon each other that they bring but one result to the ear—a phenomenon exactly of the same character with the stream of fire which a kindled match produces in the hands of a child, when shaken very rapidly backwards and forwards. Wires and strings of metal and catgut—slips of metal—fine membranes—and columns of the air itself enclosed in tubes—are the most familiar means of producing sounds of this kind, and are in fact the basis of the construction of all musical instruments, the human voice included. The *quality* of the tones which flow from these instruments may be fine, without being perfectly musical. To give them this character in perfection, they must be of certain *pitches*—that is to say, certain exact degrees of *graveness* or *shrillness*. And here lies the most mysterious and most interesting property of musical sounds.*

These various degrees of graveness or shrillness are

* A membrane at the top of the windpipe is the instrument of the human voice. The column of air enclosed in the flute, bassoon, trumpet, and all other wind instruments, is the sounding body in their case. The harmonicon and musical snuff-box are examples of the instruments which contain slips of metal. The most noted stringed instruments are the harp, violin, and piano-forte.

produced in different ways on different instruments; but we shall select a common catgut string of medium thickness as the best means of describing them. Let this string be screwed between two pins to such a tightness that it vibrates exactly two hundred and forty times in a second of time. When thus screwed, and struck or twitched by the finger, it gives forth a certain sound, corresponding in gravity with the note with which a man is apt to start in singing a simple melody. This sound is a particular existence in nature—has a certain particular place in creation—just as much so as the type of the human figure, or the form of a drop of dew, or the "great globe itself." Two hundred and thirty or two hundred and fifty vibrations, would be something else, and not nearly so agreeable to the ear. There must be just two hundred and forty vibrations, in order to make it what nature has designed it to be. To this sound, thus precisely produced, we shall give the name by which it is universally recognised by continental musicians—*Do*.*

If the string which gives forth this sound, or note, be either screwed up so much higher as to vibrate twice as fast, namely, four hundred and eighty times in a second, or shortened by one-half, which has the very same effect in multiplying the vibrations, a *shriller* sound is heard, but yet correspondent with the other, so that the two notes, struck together, produce an agreeable single sound.

This shriller note is produced when the original string is divided by two. Suppose the string—and, for the sake of simplicity, let one of forty-five inches be understood—is divided by three, and the two-thirds, or thirty inches, are struck. The string, thus shortened, emits a tone which most men will recognise as also very agreeable. We describe it as *Sol*.† It is found that when *Do* and *Sol* are struck together, there is a fine coincidence in their united sounds. They are in *harmony*. And their being so is just as natural as that two multiplying one makes two—three multiplying one, three—and so on. In the first case, be it observed—that is, when the two *Dos* are sounded—there is a composition of sounds, one of which has exactly two vibrations for one of the other; while in the second case, where *Do* and *Sol* are sounded, there is one vibration in the one note for every three in the other; hence there is a coincidence between the compound notes, respectively at every second and every third vibration. If two men sound with their voices either the two *Dos*, or *Do* and *Sol*, together, the effect will be not less harmonious, for the vibrations in the respective larynxes of the two men, will bear the same numerical relation to each other, however impossible to see these exquisite membranes in the act of producing their various sounds. And in all other instruments precisely the same phenomena will result.

The string may be screwed or shortened to the production of various other proportionate numbers of vibrations, with a like agreeable effect. Between the whole length, *Do*, and the two-thirds, *Sol*, there are three degrees of length or tightness of string, which give forth beautiful notes. The first requires 8-9ths of the string, or as forty inches; the second 4-5ths, or thirty-six inches; the third 3-4ths, or thirty-three inches and three-quarters of an inch. The notes thus produced are entitled *Re*, *Mi*, and *Fa*.‡ Between the two-thirds, *Sol*, and the half, which is the repeti-

tion of *Do*, there are two notes, one of which requires 3-5ths of the string, or as twenty-seven inches, and the other 8-15ths, or as twenty-four inches; and to these are given the names *La* and *Si*.* Thus there are, in all, seven notes, the powers or sounds of each of which can be calculated with as much nicety, and made as sensibly visible before the eye, as the most minutely elaborate problem in arithmetic.

Let the reader who has hitherto been unacquainted with the theory of music, observe these proportions attentively.† He cannot fail to perceive at a glance that the gradation is by no means regular. The shortening of the string, for the production of the successive notes, is successively five inches—four—two and a quarter—three and three quarters—three—two—and one and a half. There is something surely very striking in this irregularity, when we consider that the notes, as thus described to a hairbreadth and a vibration, are those sounds which the voice itself naturally forms, and which the mind recognises as agreeable—the absolute things designed by nature to constitute music. In two instances, the *interval*, as it is expressively called, between the notes, is just about half of the intervals between the rest. These are the spaces between *Mi* (E) and *Fa* (F), and *Si* (B) and *Do* (C). For this reason, *Fa* and *Do* are called *semitones*. How surprising—how significant of creative design—that the larynx of man's body should have been framed to produce, and the musical faculty of his mind framed to perceive and enjoy, this incomprehensible irregularity! Nay, there is more in it. It is found, that, when a semitone succeeds a full note in melody, the effect is to suggest mournful and pensive ideas to the mind—to attune the listener to the gentlest and most affectionate feelings. This is the basis of what gives such infinitesoftness to Scottish music, and what causes the national airs of Ireland to appear as if they expressed the incessant heart-break and misery which have distinguished that beautiful but most unhappy land from old times even down to the present day. There is something in it that seems akin to the very tones in which we would be disposed to tell a melancholy tale, or soothe a mourning friend; and in all probability—though the present writer cannot speak of it as a point admitted in philosophy—the voice, in mourning or in consoling, does usually assume a key which introduces those notes of tenderness and woe.‡

The seven notes are repeated or multiplied in graver or shriller forms by proportionate lengths of string and numbers of vibrations, according to the principles already explained. Thus we may descend to a sound of *Do* produced by only a hundred and twenty vibrations, to another and another still, produced respectively by sixty and by thirty: below thirty vibrations, a sound is not considered musical. Again, we may ascend from the *Do* of four hundred and eighty vibrations to one of the double, of the double of that again, and so on. Each repeated note is technically styled the *octave* of that above or below, as being the *eighth* from it. The human voice scarcely sounds more than two of the octaves, and the intermediate notes, and each instrument has its particular range of notes, or *compass*, few having more than six octaves. Sounds of above thirty thousand vibrations in the second, of which

* A and B of British musicians.

† The reader is requested to turn to the last page of the present number of the Journal, for a minute tabular view of these proportions.

‡ An eminent musician once remarked, that, if he had been provided with paper and pencil during one of Mrs Siddons's performances, he could have reduced the intonations of her voice, in particular speeches, where grief was expressed, into a musical scale.

* British musicians call it C; but we deem it most convenient for the exposition of music as a branch of natural philosophy, to use, in this and subsequent instances, the syllables which are applied to the notes throughout other parts of Europe.

† The G of British musicians.

‡ D, E, and F, of British musicians.

the cry of the grasshopper is an instance, are so fine as scarcely to be caught by the human ear. Thus, in all, there are about ten octaves, or seventy notes, of music, within human perception. Musicians, it may be mentioned, have inserted five semitones between each of the pairs which are full tones, so that the full list is thus described in Britain—C, C sharp, D, D sharp, E, F, F sharp, G, G sharp, A, A sharp, B—and by these means it is possible to commence tunes on a variety of *pitches* or *keys*, and have, in each case, the use of those semitones which give them the character just spoken of. But it is not necessary on the present occasion that we should fully describe the powers or uses of these five intermediate half notes. They are very conspicuous to the eye in the piano-forte, being the *black keys*.

The simplest kind of music is a combination of the notes in succession, either quick, or slow, or of moderate rapidity; and this constitutes *melody*. The possible combinations, like those of the alphabet, are of infinite variety; and so wonderfully relative is music to all that we can feel, that, by a few notes thus thrown together, almost any emotion of the mind can be expressed. By the use of the semitones, as already mentioned, sorrow, and sympathy with sorrow, may be expressed. Gloomy ideas are sound-painted by low notes, slowly executed. High sharp notes, rapidly produced, form the natural language of anger and vituperation. Quick movements and brisk transitions, up and down the middle and high notes, give voice to gaiety and fun. One in the least accustomed to play on the piano-forte, can just as readily give unpremeditated expression to the feelings of the moment by a run along the keys, as he can utter his thoughts in words. Melody is in fact a species of natural language, and one which even the so-called dumb animals can employ, as well as feel. The lion has been found to disregard all the notes of the piano-forte except the low ones—those which we always employ to express destructive feelings. At hearing these, he rises in wrath, and gives expression to all the most violent tendencies of his nature.

Melody is greatly improved when its notes are accompanied, either on the same or another instrument, by certain notes which sound in unison. The *eighth* above or below any note is the most perfectly in unison with it, because, being produced by exactly half or double the number of vibrations, one out of every two of the one note is coincident with one of the other; and hence an octave forms the most agreeable double sound in the scale. A *fifth* above, being the result of a third more vibrations, and consequently having one to three vibrations coincident, is the next most harmonious. On a similar principle, the *third* above is next in point of agreeableness. Other double sounds are comparatively discordant and harsh, in consequence of there being less perfect or regular coincidence in the vibrations of the two notes composing them. Upon thirds, fifths, and octaves, then, are built the principles of *harmony*. It is worthy of notice, that here also we see *design* very conspicuously displayed, for nature herself points out these principles by a law of her own: it ought perhaps to have been mentioned before, that, when a musical string is struck, not only does it vibrate from end to end for the production of the desired note, but halves and two-thirds and other proportions of it have *subordinate vibrations*, which give forth, in unison with that note, though in a fainter form, the notes which those halves and other proportions of string would have sounded in full, if the string had been of the lengths respectively required. The ear readily catches those faint notes in the ringing of a church bell, and the twang of the thickest string of the violinello—being, in the case of the bell, produced by vibrations of certain portions of the metal; and the octaves, twelfths, and seventeenth, are the notes chiefly heard in those instances. Thus we see that harmony is also a thing provided for in nature, and that man only follows that unerring guide, when he accompanies a melody with the corresponding notes above or below.

We have now seen, that, for the production of musical sound, several things are required—a vibrating body, the air as a medium, and the fine membrane of the ear as an organ to convey the effect to the mind. Little has hitherto been said of the fourth and most important element, a mental faculty to receive the impressions communicated by the ear—for the ear, it must be obvious, is as much a mere physical organ or medium as the air itself. That there should be such a faculty, as a completion of the machinery concerned in music, is clear enough; and that there is, appears satisfactorily proved, by the early and independent development which it experiences in many minds, and the independence of all other mental gifts which it usually manifests at all periods of life.

Persons of all sorts of general character are found possessed of, or deficient in, the musical gift and feeling. Very depraved men, and individuals little removed from idiocy, are found to have it in unusual strength; while some of the most able and the most moral do not know a note, and cannot enjoy the simplest melody. Dr Johnson and Walter Scott are examples of poets and versifiers who knew not the charms of music; and the late Dr James Gregory, a man of uncommonly vigorous general intellect (if such an expression be correct), thought the best of it "only as good as any other noise." Nations low in the moral and intellectual scale, are also in some instances possessed of good musical endowment, while amongst ci-

vilised nations distinction in music seems to be no criterion of any other kind of eminence. It must therefore be held as a popular error, that he who has not music in his soul is unfit to be trusted. While these facts, however, are adduced as tending to prove music to be a distinct faculty of the mind, it is to be remembered, that, for its production, certain other faculties are necessary, while the prevailing dispositions of the individual are in all cases sure to give a tincture to what is produced, and a predilection for certain kinds of music. Time is an important element in music, and number also; and nothing can be more likely than that the elements of mind corresponding to these things are concerned in bringing forth proper melody. Mozart, though remarkably inattentive to money matters, was a skilful arithmetician, and greatly addicted to numerical calculations. Storace, an eminent English composer of the last age, had exactly the same peculiarity. Then it will scarcely be doubted, that, where the faculty for music exists, it will probably be greatly affected by the degree of general good taste, the love of the sublime, the beautiful, and the elegant, which the individual may manifest. Mechanical faculties are further required for instrumental performing, and a turn for imitation will unquestionably be of considerable importance. That a bold character will like bold music, that a mild and affectionate character will delight in the plaintive and the soft, that a devotee will enjoy hymns, and a merry fellow glee and catches, and that each of these persons, if composers, will be apt to generate the kind of music they like best, are propositions so evident that they need not be dwelt on. It is necessary, however, to state these views carefully, as individuals are often found to possess a good sense for musical sounds and a pleasure in hearing them, who at the same time, having no great endowment of these auxiliary and sympathetic faculties, are baffled in the effort to become musicians, and show little discrimination of the styles of music.

We have now, then, a vibrating body, an agitated aerial medium, a fine nervous membrane, and a mental faculty, all concerned in the concord of sweet sounds. We have seen some reason to admire the delicate character of the three first agents, but not perhaps enough to convey a full sense of their admirable fineness. It has been stated that certain vibrating bodies perform thirty thousand of their vibrations in a second of time. How exquisite must be the constitution of those membranes, thus to do what even the imagination of man cannot picture or conceive—what we can know by means of arithmetical figures, but would vainly endeavour to form an idea of! Then it must be remembered that thirty thousand waves issue in consequence along the sea of air, and spend their little force in the same minute space of time upon the shore of the human ear. And not only this, but a hundred instruments may be played together, and the air is traversed instantaneously by a greater or less number of these waves from each—not one of which has the least chance of extinguishing another. The ear must be an equally fine thing, which can receive those accumulated waves of the gravest or the shrillest melody, and give a faithful report of all and each of them.

We now come to consider the character of the mental faculty. This, it must be allowed, is in many individuals very dull, though in none probably altogether insensible. We are here in a different department of philosophy, and are not to expect the same uniform laws as in the physical agents already described. The great law of mind seems to be unequal endowments in different individuals—no doubt for some high providential end, but still such appears to be the nature of the law. Some individuals are, accordingly, little capable of either producing or enjoying music. A great majority have a moderate endowment of the faculty. A few have it in a wonderfully high state of perfection. Even in a moderate endowment, it must surely be a very fine mechanism—all hid as it is from our eyes—which instinctively dictates the sounding of the notes, and perceives their accuracy and their beauty to the hundredth part perhaps of what constitutes them—for ten vibrations less than the nine hundred and sixty constituting a high Do or C, would be detected by a good ear. To distinguish one out of many instruments in an orchestra, to trace it through all the maze of music that fills the room, and to point out the least divergence it may make from either correct pitch or correct time, are no extraordinary powers; but how significant are they of the fineness of the faculty. With the proofs we possess of the great niceness of musical perception, it is scarcely possible to resist the conclusion that the organisation, whatever it may be, on which this faculty depends, must be no less fine, if not much finer, than those multitudinally vibrating bodies which produce and report the sound, or that thin fluid which conveys it.

Further—this exquisite faculty, though in small endowments in some individuals, is universal amongst the race, and has been so, we may well believe, from the creation of man. In this point of view, music becomes a chain of universal sympathy, both as to

* That there is a distinct musical faculty in the mind, taking aid from other intellectual powers, and liable to be affected by the prevailing sentiments, is the phrenological doctrine. We adopt it because it appears the hypothesis most consistent with nature. An article by Mr William Scott, of Edinburgh, which appeared in the Phrenological Journal a few years ago, is the most philosophical view of music, as a department of mental science, with which we are acquainted.

space and time. The seven notes, it has been shown, are absolute existences in nature. Physical bodies and air are every where, and must have been at all times, capable of producing them. The savage of Guinea sounds them in unison to a vibration with the enlightened Englishman or the German. The Greek piped them by the fount of Castaly and in Tempe's vale, in days before even Homer had sung. If there was music in Eden, it could be no other in constitution than that which now steals away the cares and softens the sorrows of the most hapless of the children of Adam. Even before man existed, the melodies of nature must have sounded for ages unheard, companions in waste and non-enjoyment to the glories of that magnificent vegetation which, when man awoke, he found buried in dark transmutation beneath his feet. Poets have dreamt of such a thing as the music of the spheres, as if those orbs which process along the sky were themselves gorgeous instruments for the production of a divine harmony, ceaselessly sounding the praises of creative omnipotence. But this may not be altogether a dream. Light and colour appear to be the same there as here—nature is probably the same in all respects every where. We may therefore, without any great licence of imagination, suppose that those distant orbs contain bodies to give sound, atmosphere to convey it, ears to report it, and souls to measure, to modulate, and to enjoy it.

In conclusion—when we reflect on what music is, how it is produced, and how it is enjoyed, we would ask if it do not show, as expressively as any department of nature, the perfections of creative wisdom, and the beneficence of creative design? Could all this exquisite machinery have been made in vain—or could it have been made otherwise than by that Being who cannot err? The rain falls on the just and the unjust alike—so music may be employed by man for wrong as well as for legitimate purposes. But can we doubt that it was given to him as one of those things which were to be at his command, for a reasonable use under the guidance of his judgment—one of the ailments of his life, a solacement to mitigate the pains of his lot below, a luxury to heighten and refine all his pleasures?

PARIS—THE BET.

I WOULD not give twopence for the man who should open his eyes after his first night's sleep in Paris, and who should coolly ring for his shaving water, and then lie yawning with the same indifference that he would do in his own bed at home. This was not my case; I was all alive to get dressed, and to be out; and if it had been otherwise, I should have been allowed but little opportunity of indulging in laziness; for a lively little French marquis of my acquaintance was with us before we had got rid of our robes-de-chambre. "Ah, my dearest friend!" exclaimed he in French, and at the same time embracing me with all the fervour of continental manner, and bowing with repeated reverences and compliments to my companion, "welcome to Paris a thousand times!—welcome to this great centre of art, of science, and of taste! Ah hah! now I shall have my revenge! Now I have you in my power! Now I have it in my power to repay you for all your kindness to me when I was a stranger—yes, and more—an exile in your country. Now I shall enjoy the honour of making you wonder at the splendour, the magnificence of Paris—of Paris, the great emporium of all that is excellent in the civilised world! And, *morte de ma vie, messieurs!* how fortunate you are to have arrived just in time to be present at one of the most sublimely imagined spectacles that ever the mind of man conceived, surpassing indeed any thing that was ever thought of in the classic days of Greece or of Rome!" "My dear marquis," replied I, "you excite my curiosity greatly to know what this glorious spectacle is to be." "Glorious indeed!" replied the marquis. "This most auspicious day, *messieurs*, is dedicated to the highly important ceremony of placing the Corinthian capital upon the imperishable column of Bourbon sovereignty. The statue of the good Henri IV. is to be this day restored to its ancient position on the Pont Neuf. *Mes tres chers amis*, all Paris is agog with expectation. The statue, exalted on a grand triumphal car of immense magnitude, is to be drawn to the spot destined for it, by forty of the most beautiful oxen in all France. Only fancy the grandeur of its slow and steady advance amidst the acclamations of the people; typical, as it were, of the gradual but sure progress of the growth of strength of the Bourbons in the affections of the French nation!" "Ah, that will indeed be a fine sight," said I; "that is, if the bullocks have been carefully trained for the work they have to perform." "Nay, as to that, I know not," said the marquis; "but they belong to the king, and how can they, how can any thing, fail on such a day? *Mais, allons*. I must hasten to visit some other friends, and shall be with you again in good time to be your guide thither."

Having hastily devoured breakfast, and dispatched the important business of securing a good carriage and a valet de place, in the selection of which last we were less fortunate, we drove to Lafitte's for a supply of money, and then made a hasty tour of some of the principal streets, to deliver divers letters of introduction. Our most agreeable visit was to the so justly celebrated Biot. The very elegant compliments he has paid to Great Britain, and the sense he entertains of its hospitality, so gratefully expressed by him in some of his writings, are not words of course or mere empty phrases. His intelligent countenance beams with pleasure when he sees one of our countrymen. He received us with so great a warmth of kindness, and he was so full of anxiety to know how he could be useful to us, that I shall never forget the agreeable interview we had with him and Madame Biot. We got back to our hotel just in time to receive Monsieur le Marquis.

He came, accompanied by a certain rich, good-natured, fox-hunting English baronet of our acquaintance, who, in addition to his being a perfect stranger in France, was utterly ignorant of its language, so that our friend the marquis always spoke English when in his company. This, to be sure, he was disposed to do as much for his own gratification as from necessity, for he particularly prided himself upon his great acquirements in our language.

"But, I say, Mooshee le Marquis," exclaimed the baronet, after the ordinary ceremonies of recognition were over, "do you really think, now, that these forty bullocks you speak of can be made to pull together in harness? If you French can do that, I'll say that you are bang-up fellows indeed." "Ah, my dear frainde," replied the marquis, with a shrug, and an air of complaisant contempt, "you will not know vat we can do en France—mais you will see." "I dare say you are very clever," replied the baronet; "but I'll bet you fifty guineas to ten that your forty horned cattle don't bring the statue to the Pont Neuf by midnight." "Vat you say?" exclaimed the marquis; "de forty bullock not bring de statue of Henri IV. to de Pont Neuf bifor midnight! Ho! ho! ho! dat is too moosh good, I declare. I tell you, sare, van leetle secret. De king's master of de horse will be dere—and do you tink dat de master of van hondred horse cannot manage von forty sons of cows?" "Well, mooshee," replied the baronet, "you shall have the master of the horse if you please—ay, and all the butchers of Paris to boot, if you will—and I take it that your knights of the cleaver will in this case be your most useful auxiliaries—though I believe that your French butchers have more to do with bull-frogs than with bullocks—but be that as it may, I bet you an hundred guineas to ten that old Harry is not set up on the bridge by twelve o'clock to-night." "I do say done to dat bait," said the marquis hastily, and rather a little out of temper; "and—aha, monsieur, you will see dat you vill ave to pay me de guinée to-morrow; ha, ha, ha! dat is goot indeed. Come, mesieurs; it is time to go."

The baronet mounted the box of his open carriage, of English build, drawn by four spanking blood horses. We three got into it; and, as he gathered up his ribbons, he looked knowingly over his shoulder to the Frenchman, and said, "Mooshee, though we can't drive horned animals in our country, we know how to make horse-cattle put down their pumps—ya-hip!" And then most scientifically flourishing the silk about the ears of his leaders, off he dashed with us, and rattling through more of the narrow streets than was absolutely necessary, evidently for the express purpose of astonishing the natives, he, by the piloting hints which he from time to time received from our French friend within, at last brought us to the Boulevard, and as near to the show as the crowd and the drawn sabres of the dragoons would allow us to approach.

From the magniloquent expressions of Monsieur le Marquis, our minds had been filled with the anticipation of something like a Roman triumph. But fancy our mortification, when, on stretching our eyes over the dense mass of the crowd ere we got down from the carriage, the first thing that caught our attention, rising vast above the heads of the people, was a blue silk drapery, thickly sown with silver fleurs-de-lys, and completely shrouding a huge unintelligible mass over which it was thrown. Under this the statue appeared like a shapeless block, or, if shape it had at all, it was rather like that of some of those strange uncouth-looking figures which the boys are sometimes seen to erect of snow on a village green, the head appearing without features, like that of a Dutch doll. As we were still at a very considerable distance from it, the undulating motion of the sea of human beings by which it was surrounded, produced the deceptive effect that it was in slow motion. "Aha, Monsieur le Chevalier," cried the marquis in perfect ecstasy, "vat do you say now? De oxes of France more viser, more gentle, more sensible, more imagination, dan de oxes of England. See how grand, how sublime, dey do move! Not fast, fast, fast, like your orses, but vid all de grand dignity dat suit de solemnity of de occasion. Superbe!—magnifique!—no shout from de people—all struck vid awe. It is vane fine!" "Why, Mooshee," cried the baronet, turning round on his box, "they are standing stock-still. If there be any movement at all, it must be in your own brain, for oxen, car, and statue, are all as fixed as the monument." "Hay!" cried the marquis, rising on the seat of the carriage, and stretching for-

ward over the back of the box to get the better view, and rubbing his eyes to assist his vision, "dey do move more lentement dan I did suppose; mais de more lentement, de more sublime." "Ay, old Harry seems to be aware of that," said the baronet, laughing; "and so he thinks that the most sublime thing of all is to stand still, and his forty oxen are of the same opinion." "No, no, no!" cried the marquis impatiently, "none of your joke, Monsieur le Chevalier; dey not stand stock. Let us descend, and go to see more near."

We now all left the carriage, and, pushing our way through the crowd, we soon reached the car and the oxen. The car was immovable; not so the oxen, for they, covered with ribbons and silk draperies, were kept in continual motion by the terrific goads and whips, and shouts and execrations, of their drivers. They sprang to this side and to that, and backwards, and they made furious plunges forward also; but, unfortunately, when one pair, or rather when one ox, was pulling forward, the rest were making their independent exertions each to a different point of the compass. The marquis was thunderstruck. He bit his nails with vexation; and, devoted to the reigning family as he was, it was well for his feelings that they were too much absorbed in disappointment at this failure of the grand spectacle of which he had prognosticated so much, to hear the murmurs of disloyal satisfaction that were every where bursting from the chuckling populace around him. In his present state of mortification, it was charity to endeavour to withdraw him from the scene. "It may be but a temporary stop, Monsieur le Marquis," said I; "suppose you take us to see the Pont Neuf, where the statue is to be erected. His majesty may, perhaps, very soon follow us thither." "I'll bet double the money that he will not be there by twelve o'clock to-night," said the malicious baronet. The marquis said nothing, but hurried us on to the carriage, shrugging his shoulders as he went.

On reaching the Pont Neuf, we found a crowd almost as large as that we had left, impatiently expecting the arrival of the statue; and as some of the jeering expressions which fell from the populace around us, regarding the delay of the procession, began to strike the ears of the marquis, and greatly to disconcert him, he anxiously urged us forward, with the view of visiting the cathedral of Notre Dame. We had, however, no sooner satisfied ourselves with an inspection of this ancient and interesting structure, than the indefatigable marquis hurried us away to look at the Palais de Justice, which figures so prominently in the history of the revolutionary troubles.

Having returned to the carriage, we got in, and the baronet mounted the box. "Had we not better drive to the Boulevard, to inquire how the old gentleman in the blue cloak gets on?" said he over his shoulder. "Non, non!" cried the marquis, impatiently. "Allons! dis vay, dis vay; I will direct you to de Louvre; you must see l'exterieur of dat." The baronet chuckled, and drove on, and, by dint of the directions he received from the marquis, we were soon in the court of that magnificent palace. An hour or two were thus spent, but at length there was a general inclination to move.

The wicked baronet now made good his point, in spite of all that the marquis could do. Having taken up our valet-de-place on the box beside him, he secretly consulted him as to the route that led to the Boulevard; and in spite of all the impatient exclamations of monsieur, he whisked us off thither with as much certainty, and with much more expedition than any driver of a Parisian fiacre could have done. To the great relief and inconceivable joy of the marquis, and to the partial discomfiture of our honourable coachman, we discovered to our surprise that the car with the statue had been moved a few yards forward on its journey, by what means we could not learn. But there again it and the forty animals stood in what our American brethren would call a dead and unhandsome fix. What was strange, the marquis and the baronet were each rendered more sanguine by this survey of the state of things, and we went to dine at a restaurateur's in the Palais Royal, with all parties in the best possible humour.

After dinner was over, we sat for some time in the English fashion, recreating ourselves over an excellent bottle of Burgundy, and with the window close to us wide open, in order to enjoy the freshness of a most delicious evening. We sat thus apart in a little world of company, for there were two rooms *en suite* filled with numerous tables, where small parties of ladies and gentlemen were accommodated. This mixture of the sexes gives an air of superior civilisation to public eating-rooms abroad, and the presence of women seems to insure a strict adherence to the rules of propriety and refined politeness. Each little group enjoyed its own conversation without observation or interference from the others. Looking out as we did on the rich verdure of the grass and the trees, and the refreshing waters of the fountain continually playing in the midst of the great open space, all of which give additional beauty to the architectural façades by which they are surrounded, and beholding the many lively groups of people who either were happy, or were determined to appear so, we almost forgot that there could be any thing like rottenness and poison within. After we had had our coffee, the baronet eagerly proposed a trip to the Boulevard to ascertain how old King Harry was getting on, but we, who understood French, felt it

easy to account for the disinclination of the marquis to agree to this, from having overheard certain triumphant exclamations of satisfaction that burst from some of the people in the coffee-room, and which indicated any thing but the success of this Bourbon show. He proposed the opera, where we went for an hour. There the hopes of the marquis were again buoyed up about his bet by some rumours which he heard from a friend whom he met, and he returned with us in the highest glee to sup at the Palais Royal, where, in the exultation of his heart, he called for ortolans and Champagne.

The baronet very much relished the wine, and having a strong, and, as he thought, well-grounded hope, that his bet was secure, his spirits rose, and he helped himself to several bumpers in succession. "I require this, Mooshee," said he to the marquis, with a significant nod and a comical leer in his eye; "I require this to give me nerve to stand the loss of my hundred guineas." "Ah ha! den you do tink you ave loss, Monsieur le Chevalier?" replied the marquis, with an air of triumph. "Ah ha! ve shall see, ve shall see. It is near twelf a'clock, so ve shall ordaine van voiture to take us down to de Pont Neuf to decide vho as to pay de oder." He sent out a waiter for a fiacre, and, becoming extremely animated in his talk, he proceeded to prove to us that it was quite impossible that so grand a spectacle could have failed. After he had been so occupied for some time, the fiacre was announced; but then, on looking around us for the baronet, we found that he was missing. We expressed our surprise—we inquired of the garçon—but all that we could learn was, that the gentleman had left the house in a fiacre which he had previously ordered. "Ah ha!" exclaimed the marquis, triumphantly, "he as gon hom; he is ashamed to go to de Pont Neuf—ha, ha, ha! But we most go dere, dat you may decide and prove to im vitch as vin and vitch as loss. Allons, ve shall be dere before twelf."

Ordering the driver of the fiacre to go as fast as he could, we were soon set down at the end of the Pont Neuf. The streets in this neighbourhood were by this time nearly deserted, and the sky dark, save in one place, where the moon shone feebly through a filmy part of the clouds. The light was enough, however, as we advanced along the bridge, to enable us to see that the pedestal intended for the statue, close to the parapet, was not unoccupied. "Ah bah!" cried the marquis, in ecstasy, "I do vin my hundred guinée! Bravo! pritty vell done de forty oxes of France. Aha! dere he stand—le bon Henri Quatre! Vat say Monsieur le Chevalier now? But you are vittess dat I do vin my bait. It is not yet twelf a'clock. Ah, dere it do begin to strike in de tower of Notre Dame. Mais n'importe—le bon Henri Quatre is dere. Ah ha, Monsieur le Chevalier, you not lay von hondred guinée to ten vid me again, je suppose." "And why not, Mooshee?" demanded the statue, with a hearty laugh. "Ha!" cried the astonished marquis; "am I to be insult? Parbleu, I vill ave satisfaction. Come down, sare—I vill ave pistole and swords—come down, sare, I say;" and utterly unable to control the sudden rage into which he had been thrown by this sudden discovery of the baronet's trick, he sprang up on the pedestal to pull him down. In making this effort, he unfortunately pitched his head right into the stomach of the portly representative of the royal statue, who was at that time standing balanced in one of the finest attitudes he could possibly assume. The consequences were fatal; the baronet lost his equilibrium, and was precipitated headlong over the parapet into the Seine. Seized with horror, we rushed to the side of the bridge, and vainly stretched our eyes through the obscurity, to ascertain the fate of the unfortunate man: we could see nothing but the indistinct flow of the water as it curled sluggishly away. The marquis stood for a moment stupified; then the whole of the sad reality of this melancholy catastrophe having come upon him at once, he leaped down upon the pavé, and began beating his breast and tearing his hair like a maniac. "Merciful powers!" cried he, in French, and in accents of the bitterest anguish, "what have I done? Murdered my friend in the madness of my rage! What shall I do? But I will not survive so fearful a calamity. No! The same watery grave that has entombed him, shall receive me also;" and rushing to the parapet, he would have thrown himself over, but for our exertions, and it required all our strength to hold him.

Having succeeded in dragging him back, we carried rather than led him from the bridge, whilst he raved and stormed like a madman. At length we found our fiacre; and as it was impossible to abandon him, we put him into it, and drove with him to his hotel, where much time was expended in persuading him to retire to his apartment; and we felt it necessary to give particular instructions to his valet to see that he should on no account allow his master to quit the house. We then drove with all manner of expedition to the hired mansion of the baronet, to inform his servants of what had happened, and to send them to make the necessary inquiries at the Morgue and elsewhere. We found a favourite Yorkshire groom in waiting. "Joe," said I, "a sad calamity has befallen your poor master." "Ees, sur, I knows all about it," said he, with a dismal visage. "But, Joe, have you sent to seek for his body?" "Whoy, sur, his body be comed whuome," replied Joe, in the same tone; "I hae jist been a-rubbin' it hard down wi' a wisp o' strae. It's in here

"—walk this way, gentlemen." Shocked at the coarseness of the fellow who could have employed straw for such a purpose on such an occasion, we followed him in silence. The door was opened; but what was our surprise at the spectacle we beheld! There sat the baronet in his nightcap, before a roaring fire, with his body wrapped up in blankets, his feet and limbs in a knee-bath, a large jug of hot brandy punch smoking on a table beside him, and a lighted cigar in his mouth. "Glad to see you, glad to see you, gentlemen," cried he; "pray be seated, and no ceremony. Joe, you dog, chairs for the gentlemen. Faith I had nearly paid dear for my trick on mooshee. But lucky it was for me that I was bred at Eton, and can dive and swim like a wild-duck. I no sooner found myself in the water, than I shook my ears, struck out like an otter, and reached one of those big boats where we saw those funny washerwomen so busy this morning—and so, by clambering over it, I got ashore. By great good luck I met with a jarry, who, after a little palaver, and some cross purposes between us, took me home; and so after having been well wiped down by Joe there, just as he does the hunters after a hard day's run, I now feel myself pretty comfortable. Joe, some hot brandy and water, and cigars, for the gentlemen." At this moment a noise was heard without, a scuffling as it were in the passage, and in rushed the marquis in his dressing-gown and slippers, with his servant after him. He stood for a moment staring with astonishment, and then flying upon the baronet with a yell of joy, he almost suffocated him with his embraces, whilst he laughed, cried, shouted, and danced, till we began to think he had only escaped one madness to fall into another of a merrier but equally hopeless description.

LOSS OF THE ROYAL GEORGE.

THIS event being lately alluded to by a gentleman in presence of his children, he found that none of them had ever heard of it. Accustomed in his own early years frequently to hear it not only alluded to, but detailed, he was at first surprised to find that a few grown-up young people were ignorant of it; but the circumstance is not in reality surprising. The generation to whom last century events were familiar, is passing away; and the bulk of the community now date their births from years subsequent to 1800. Nay, however startling it may be to some, even the last war is already becoming so remote an event, that a very great number of persons, now acting their parts on the stage of life as heads of families, have no recollection of it. Under these considerations, and being of opinion that the loss of the Royal George was a remarkable incident in itself, we have caused the following brief account of it to be drawn up from authentic sources.

The year 1782 saw Britain in a more humbled condition than any former one for a century. The attempt to coerce the American colonies, and the war with France, Spain, and Holland, which resulted from that attempt, had completely exhausted the national resources; and the people witnessed the unwonted spectacle of a French fleet defying the coasts of England with impunity. It was at this juncture that the special calamity of the accidental loss of the first ship in the navy took place.

A fleet was in preparation at Portsmouth for the relief of a brave garrison which had long held out Gibraltar against the fleets of Spain. Amongst the vessels destined to sail on this expedition was the Royal George, fitted to carry a hundred guns, but in reality mounting a hundred and eight. A contemporary document states—"She was the oldest first-rate in the service, her keel having been laid down in 1751. She was rather short and high than agreeing with the rules of proportion at present laid down, yet so good a sailer that she has had more flags on board than any vessel in the service. Lord Anson, Admiral Boscawen, Lord Rodney, and several other principal officers, had repeatedly commanded in her. Lord Hawke commanded the squadron in her which fought the French under Conflans, when the *Superbe* of seventy guns was sunk by her cannon, and the *Soleil Royal* of eighty-four driven on shore and burnt. She carried the tallest masts and squarest canvass of any English-built ship in the navy, and originally the heaviest metal, namely, fifty-two, forty, and twenty-eight pounders; but they were lately changed, on account of her age, to forty, thirty-two, and eighteen pounders."

Before the Royal George could sail, it was deemed necessary, on account of the age and unsoundness of her timbers, that she should receive a *careening*—namely, an inspection and repair of the parts usually under water. If time had not pressed, she would have been towed for this purpose into dock. As the case stood, it was resolved that she should be laid over on her side, as usual when a slight careening is required, in calm weather and in smooth water. So little difficulty or danger was apprehended, that the admiral, captain, officers, and crew, amounting to about nine hundred persons, continued on board; neither guns, stores, water, nor provisions, were removed; and fully three hundred women and children, mostly relatives of the seamen, were on board from the neighbouring harbour.

Early in the morning of the 29th August, the work was commenced by a gang of carpenters. The vessel received what is called a *parliament heel*, or, in ordinary language, was caused to incline in the water, so

as to expose her lower timbers. It was afterwards stated that the workmen, finding it necessary to strip off more of the sheathing than was expected, in order to come at a certain leak, heeled her a little more over than was intended, and than possibly the commanders knew. About ten in the morning, while Admiral Kempenfelt was writing in his cabin, and the larger number of the people were between decks, no one dreading any harm, a sudden and unexpected squall threw the vessel entirely over on her side, when, her port-holes being open, she filled and sunk so very quickly, that, as one of the survivors declared, he had only time to cry to his brother that she was going down, when down she went! A victualler, which lay alongside, was swallowed up in the whirlpool which the sudden plunge of so vast a body occasioned, and several small craft, though at a considerable distance, were in imminent danger of sharing the same fate.

The admiral, with a number of brave officers, and most of those who were between decks, perished. The guard, and most of the other people upon deck, were more fortunate, being picked up by the boats of the fleet. About three hundred in all, chiefly persons belonging to the ship's company, were saved; while from nine hundred to a thousand were drowned. The captain (Waghorne) was picked up in a much injured condition; but his son, a lieutenant, having been below, perished. The whole of the women and children, having been between decks at the moment of the accident, were lost.

This incident was universally bewailed, not so much for the loss of an aged vessel, as for the destruction of life which attended it. Admiral Kempenfelt, though seventy years of age, was peculiarly lamented. "He was held," says a contemporary record, "to be, in point of professional science, knowledge, and judgment, one of the first naval officers in the world; particularly in the art of manoeuvring a fleet, he was considered by our greatest commanders as unrivalled, and his excellent qualities as a man at least equalled his professional merits as an officer. His father was a Swedish gentleman, who, coming early into the English service, generously followed the fortunes of his master, James the Second. Being recalled by Queen Anne, after the death of that unfortunate monarch, and serving with distinction in her wars, he was promoted to the rank of lieutenant-colonel, and was, at the time of his death, lieutenant-governor of the island of Jersey. That gentleman's character was so admirable, as to be depicted and immortalised by Addison in the *Spectator*, under the well-known appellation of Captain Sentry."

The same authority adds, that a large sum of money was immediately raised, by subscription, in London, for the relief of the widows, children, and other depending relations, of those who had perished by this accident. A court-martial was held, a few days after, on Captain Waghorne, who was honourably acquitted.

The diving-bell, the improvements of which were then recent, was brought into operation for the recovery of property in the Royal George, which was the more practicable, as she had not sunk in deep water. In the ensuing November, by this means, sixteen guns and some cordage were fished up and brought into Portsmouth. In the ensuing summer, by the same means, the beer hoy which sunk with the Royal George was brought up. An endeavour was made, by great cables round the body of the Royal George, to draw her up also; but every effort failed, in consequence of the snapping of the cables. In the summer of 1784, the anchor was recovered, an immense mass of iron weighing nearly five tons. Since then, by the employment of the diving-bell at various times, other articles have been raised from the lost vessel, and some of the guns which had lain several years in the water, and become curiously oxydized, are shown to the public in London. On the last investigation, a few years ago, the mass of the vessel was found to be nearly buried in sludge.

IMPROVEMENT OF FEELING AMONG SAVAGES.

THE public is already aware of the destructive and inhumane system which has been pursued for some years with the native tribes bordering upon our possessions in the colony of the Cape of Good Hope. It is gratifying to learn that the opposite feeling—that of peace and good will, the only one that ever will benefit man individually or collectively—is now in the course of being tried, and to all appearance with the best effects. The *South African Advertiser* gives the following account of a conference lately held between Captain Stockenström, the lieutenant-governor, and some of the native chiefs, with reference to an outrage committed by one of them on our frontier, and which would have formerly been a signal for general war and indiscriminate bloodshed. Umkaye, the spokesman of the Caffre chiefs, said, "When we took hold of the pen to sign the word (treaties), we swore by God, and by our fathers, that we would keep it fast, and we wish to do so. We have therefore come to show you that we are sincere. This mischief has not been done by the Caffre nation. The great chiefs know nothing of it. Seyolo is a headstrong young man, and thinks he can do as he likes. He is doubly guilty. In the first place, he had no cause for the attack; and, secondly, if he had cause, he ought not to have acted without the consent of the great chiefs. This must be made right again. Tell us how it must be done." On this the lieutenant-governor pointed out the nature of the crime, and insult offered to the government. He said, "In the times of our fathers

this would have caused a general war. We would have sent commandoes against each other, and made reprisals; but it is now in your power to settle the matter by your councils." And concluded by saying that they must give redress by animadverting on Seyolo, and reducing him to order. Umkaye and Zeto said, "That is just." It was necessary, however, that so important a business should be proceeded in with all due formality. Accordingly, the chiefs and councillors assembled at Wesleyville, to the number of about three hundred, to decide finally on the case. At their request, Mr Shepstone publicly stated to them the view taken by his government of that affair—that Seyolo was one of their subjects—that he had violated the treaty existing between them and the British—and that the lieutenant-governor looked to them, in the first instance, for satisfaction. He then withdrew, and the council remained in deliberation for seven or eight hours. A messenger was then sent to Mr Shepstone, requesting him to name a place where he would meet them, as they were now ready to hear his word. He named the chapel, where, when they had assembled, Umhala expressed a wish that he would repeat to the whole assembly what he had said to those who were present on a former day. He complied; and when he had finished, Umhala said, "As these are the lieutenant-governor's sentiments, what is specifically required of us?" To this Mr Shepstone replied, that the lieutenant-governor could not prescribe to them specifically what they must do; but he demanded sufficient proof that they not only passively disapproved, but that they would take such measures as will effectually prevent the recurrence of such outrages. Umhala then asked, "Upon what is the stress laid? upon the cattle taken, or the death of the people?" To this Mr Shepstone answered, "Both are considered. The one is rendered more heinous by the commission of the other." Umhala then in a long speech desired him to convey to the lieutenant-governor the best thanks of the council, that he had sent Mr Shepstone to them, whom they had long known, and whom they understood (Mr Shepstone has resided long in Caffreland, and speaks the language perfectly), "and that he had not sent a commando: that he had given over to them the adjustment of the case, and had not made war upon them without sending for their hearts' thoughts. The sinner has sinned alone, and at the impulse of his own heart. We have had no communication with him. We heard what he had done, and sent our messengers to him, but he drove them away. Our living letters are here to prove what we advance. We sent to him yesterday: he refused to come. To-morrow we will go to him, and will eat him up. But we will leave his house standing, lest peradventure he may say, 'My father's children have been the cause of my committing more crimes.' We wish to have peace for ever. We have proved war to have profited us nothing. On the contrary, it has caused us to die of hunger."

RATIONALE OF ADVERTISING

ADVERTISING is an expedient for obtaining business by no means generally practised. Many tradesmen are deterred by the expense; some have no faith in its efficacy; others think it a mark of second-rate status in business, and therefore more apt to be injurious than otherwise. On the other hand, some tradesmen make a system of advertising, planting every kind of periodical, from the daily newspaper to the quarterly review, with specifications of their anxiety to serve the public, and of the merits of the articles in which they deal, and evidently spending a considerable sum of money yearly in this way. The unconcerned reader and the less acute tradesman, struck by the frequency of these appeals for business, are apt to suppose that he who makes them must be less under the influence of wisdom than of folly, and a good deal of a pretender or a quack into the bargain. There may even be a class who make a principle of disbelieving and disregarding all such appeals, and, like the Irishman, when much entreated to come, the more they won't come. Yet the regular discharge of advertisements keeps up nevertheless, and the trader must evidently find it serviceable upon the whole. It may be worth while to communicate to young tradesmen the ideas of an old one on this subject—they are simply and briefly as follows:—The first utility of frequent and regular advertising consists in this: there is at all times a large class of persons, both in country and town, who have no fixed places for the purchase of certain necessary articles, and are ready to be swayed and drawn towards any particular place which is earnestly brought under their notice. Indifferent to all, they yield without hesitation to the first who asks. Then, in the country, a considerable number of persons, who wish a supply of the article advertised, and do not know of any particular place where it is to be got, being thus furnished with the address of a person who can supply them, naturally open a communication with that address, which perhaps leads to much ulterior business. People in the country are also liable to be favourably impressed by the frequent sight of a name in the newspapers. The advertising party acquires distinction in their eyes, and thus they are led, in making a choice, to prefer him. But by far the most important effect of advertising is one of an indirect nature. It conveys the impression that the party—pretending or not pretending, quackish or not quackish—is anxious for business. One who is anxious for business is unavoidably supposed to be an industrious, attentive, civil person, who keeps the best of articles, at the cheapest rate, does every thing in the neatest and most tradesman-like manner, and in general uses every expedient to gratify and attach customers. People of course like to purchase under those circumstances, and the system of advertising as-

surging them that such circumstances exist at this particular shop, they select it accordingly. Such are the opinions of the old tradesman alluded to, and they are certainly supported by fact; for wherever an extensive and regular system of advertising is practised, and no back-drawing or unconquerable circumstances exist, it is usually seen to be attended with a considerable share of success. One feature in the philosophy of the subject must be carefully attended to. A faint and infrequent system of advertising does not succeed, not even in proportion. "Drink deep or taste not the Peirian spring."

CHAPTAL.

ABOUT the close of last century, France possessed a number of men who had obtained celebrity from their knowledge of chemical science. Among the number were Berthollet, Lavoisier, Fourcroy, Gay Lussac, and Chaptal. Some of these were distinguished as theoretic or experimental chemists, others as practical laborateurs. Of the latter class none obtained such eminence, or was so well rewarded for his services, as Chaptal. Lavoisier perished in the revolutionary troubles, when the reign of terror was at its height. An insane idea arose in the public mind that all the tobacco which was sold in Paris had been poisoned by certain chemists, for political purposes, and, in the midst of the panic, poor Lavoisier was seized, and accused of the heinous offence of poisoning the people. Notwithstanding all representations to the contrary, he was ordered for execution; and though he begged his judges to spare him for only three days, in order that he might complete certain chemical experiments in which he was engaged, his petition was refused. "The French republic has no need for chemists," said Robespierre, and so Lavoisier was hurried off to the guillotine.

Chaptal was more fortunate than Lavoisier. When Robespierre said that the nation did not require chemists, he committed an egregious blunder, for the nation was very soon put to its last shifts for want of chemists. The republic was carrying on a desperate war, both internal and external, and the consumption of gunpowder was so immense, that the supply could not be kept up. France was almost at its last cartridge. Hitherto, the gunpowder manufactories had been kept going by means of supplies of saltpetre or nitre brought from the East Indies, and imported in some indirect way through England. These supplies were now entirely cut off by the British government. No nitre was to be had. Money could not procure it. In this critical dilemma, the republican authorities looked about to see if any good chemist had escaped the guillotine, and by great good luck they discovered Chaptal, who was at that very moment included in a list of proscribed victims of the ruling faction. He was immediately applied to, and his life was promised to be spared, provided he could furnish the government with saltpetre. An ignorant man must have perished in such circumstances. Mark, therefore, the value of a knowledge of chemistry. The proposition was most welcome to Chaptal—his life was safe. He knew that nitre could be formed from the nitrate of lime in the limestone caverns and cellars of Paris, and that it could also be produced from the earthy matter in which animal substances are decomposed. He forthwith ordered a general excavation of the numerous burying-grounds of Paris; the sepulchral repose of remote generations was invaded; old monastic buildings, which for ages had been imbibing animal effluvia, and generating nitre, were erased; the owners of ancient buildings were compelled to consent to their demolition, in order that the ground beneath them might be collected and analysed; the walls of the subterranean caves and cellars were scraped, and the earth of the floors dug up, all of which, to the republic, was more precious than gold. The graves of two millions of bodies were opened; and after removing the skulls and other bones which were in a state of preservation to the subterranean quarries of the Barriere d'Enfer, which gave existence to the celebrated catacombs, Chaptal, by his chemical art, extracted from the various materials he had thus obtained an abundant supply of saltpetre, and thus France and himself were saved.

By the various governments that succeeded, Chaptal was always honoured and regarded as one of the greatest benefactors to his country. Bonaparte having, in accordance with his famous Milan decree, prohibited the importation of colonial produce through England, Chaptal was the first to suggest and carry into operation the extraction of sugar from the beet-root. For this the emperor created Chaptal a count and peer of France, and for many years he was a member of the cabinet as minister of the interior. In 1816, after the accession of the house of Bourbon, he still remained in favour, and was appointed a member of the Academy of Sciences by Louis XVIII. His works on practical chemistry stand in the foremost rank in the present day, and are particularly applicable to France, which, by its tariff of trade,

voluntarily cuts itself off from the importation of certain articles required by the nation. For example, besides the saltpetre and sugar, above mentioned, which Chaptal produced from materials within the country, he invented several kinds of cement and artificial Pozzolanas, by means of native calcined ochre, without the aid of foreign matters; new varnishes for earthenware, without the use of lead ores and plumbago, which are so often destructive of health and life; extended the application of chemical agents to bleaching, the application of old wool instead of oil, in the preparation of soap, and the mode of dyeing cotton with Turkey red. In short, Chaptal was one of the most illustrious examples of how much good may often be done by one enterprising mind, when that mind is properly directed and encouraged in its efforts for the benefit of mankind.

ADVENTURES OF RICHARD FALCONER.

I was born at Bruton, a market-town in Somersetshire, of parents tolerably well to pass in the world. My mother died when I was very young; my father had been a great traveller in his youth, and, frequently repeating his adventures abroad, I had a great desire to follow his steps. I often begged he would let me go to sea with some captain of his acquaintance; but he would reply, "Stay where you are; you know not the hazards and dangers that attend a sea life; think no more of going to sea, for I know it is only the desire of youth, prone to change; and if I should give you leave, one week's voyage would make you wish to be at home again." I used all the arguments I could think of to move my father from this opposition, but without effect. [At length, in consequence of certain family misfortunes, the father gave his consent to the departure of Richard, who proceeded to Bristol, and by the recommendation of his parent to a Captain Pultney, was put on board the Albion frigate, Captain Wase commander; it was a trader bound to Jamaica, and set sail with a fair wind on the 2d of May 1699. The vessel reached its destination in safety after a stormy voyage; what occurred next is narrated as follows:—]

Now, finding our affairs would detain us half a year longer, I obtained leave of the captain to go in a sloop, with some of my acquaintances, to get logwood on the South American coast, at the Bay of Campeachy; and on the 25th of September we set sail on this expedition. The manner of getting this wood is as follows:—A company of desperate fellows go together in a sloop, well armed, and land by stealth [to avoid an encounter with the Spaniards, to whom the country at that time belonged]; but in case of any resistance, the whole crew attend on the cutters ready armed, to defend them. We sailed merrily on our course for six days together, with a fair wind towards the bay; but on the seventh, the clouds darkened, and the welkin seemed all on fire with lightning, and the thunder roared louder than ever I heard it in my life. In short, a dreadful hurricane approached. The sailors had furlled their sails and lowered their topmasts, waiting for it under a double-reefed foresail. At length it came with extreme violence, which lasted three hours, until it insensibly abated, and brought on a stark calm. We then loosed our sails in expectation of the wind, which stole out again in about half an hour. About six in the evening, we saw a waterspout, an aerial cloud that draws up the salt water of the sea, and distils it into fresh showers of rain. This cloud comes down in the form of a pipe of lead, of a vast thickness, and, by the force of the sun, sucks up a great quantity of water. I stood an hour to observe it. After it had continued about half an hour in the water, it drew up insensibly, by degrees, till it was lost in the clouds; but in closing it shut out some of the water, which fell into the sea again, with a noise like that of thunder, and occasioned a smoke in the water that continued for a considerable time.

October the 6th, we anchored at Trist island, in the Bay of Campeachy, and sent our men ashore at Logwood Creek, to seek for the logwood cutters, who immediately came on board. The bargain was soon struck; and, in exchange for our rum and sugar, and a little money, we got five our lading in eight days, and set sail for Jamaica on the 15th day of October. Now, getting up to Jamaica again generally takes up two months, because we are obliged to ply it all the way to windward. I one day went down into the hold to bottle off a small parcel of wine I had there: coming upon deck again, I wanted to wash myself, but did not care to go into the water, so went into the boat astern that we had hoisted out in the morning to look after a wreck. Having washed and dressed myself, I took a book out of my pocket, and sat reading in the boat; when, before I was aware, a storm began to rise, so that I could not get up the ship's side as usual, but called for the ladder of ropes that hangs over the ship's quarter, in order to get up that way: whether it broke through rottenness, as being seldom used, I cannot tell, but down I fell into the sea; and though the ship tacked about to take me up, yet I lost sight of them, through the duskiness of the evening, and the storm. I had the most dismal fears that could ever possess any one in my condition. I was forced to drive with the wind, which, by good fortune, set in with the current; and having kept myself above water, as near as I could guess in this fright, four hours, I felt my feet every now and then touch the ground; and at last, by a great wave, I was thrown and left upon the sand; yet,

it being dark, I knew not what to do; but I got up and walked as well as my tired limbs would let me, and every now and then was overtaken by the waves, which were not high enough to wash me away. When I had got far enough, as I thought, to be out of danger, I could not discover any thing of land, and I immediately conjectured that it was but some bank of sand, that the sea would overflow at high tide. Whereupon I sat down to rest my weary limbs, and fit myself for death; for that was all I could expect, in my own opinion: then all my sins came flying in my face. I offered up fervent prayers, not for my safety, because I did not expect any such thing, but for all my past offences; and I may really say I expected my dissolution with a calmness that led me to hope I had made my peace with heaven. At last I fell asleep, though I tried all I could against it, by getting up and walking, till I was obliged through weariness, to lie down again.

When I awoke in the morning, I was amazed to find myself among four or five very low sandy islands, separated half a mile or more, as I guessed, by the sea. With that I began to be a little cheerful, and walked about to see if I could find any thing that was eatable; but to my great grief I found nothing but a few eggs, which I was obliged to eat raw. The fear of starving seemed to me to be worse than that of drowning; and often did I wish that the sea had swallowed me, rather than thrown me on this desolate island; for I could perceive, by the evenness of them, that they were not inhabited either by man or beast, or any thing else but rats, and several sorts of fowl. Upon this island there were some bushes of a wood they call burton wood, which used to be my shelter at night; but to complete my misery, there was not to be found one drop of fresh water any where, so that I was forced to drink sea water for two or three days, which made my skin come off like the peel of a broiled codlin. At last my misery so increased, that I often was in the mind of terminating my life, but desisted, from the expectation I had that some alligator, or other voracious creature, would come and do it for me.

I had lived a week upon eggs only, when, by good fortune, I discovered a bird called a booby sitting upon a bush. I ran immediately, as fast as I could, and knocked it down with a stick. I never considered whether it was proper food, but sucked the blood and ate the flesh with such a pleasure as none can express but those who have felt the pain of hunger to the same degree as myself. After I had devoured this banquet, I walked about and discovered many more of these birds, which I killed. My stomach being now pretty well appeased, I began to consider whether I could not with two sticks make a fire as I had seen the blacks do in Jamaica. I tried with all the wood I could get, and at last happily accomplished it. This done, I gathered some more sticks, and made a fire, picked several of my boobies, and broiled them as well as I could; and now I resolved to come to an allowance.

At night, I and my fellow inhabitants endured a great storm of rain and thunder, with the reddest lightning I had ever seen, which well washed us all I believe. As for myself, my clothes, which were only a pair of thin shoes and thread stockings, and a canvas waistcoat and breeches, were soundly wet; but I had the happiness to find in the morning several cavities of rain water, which put in my head a thought of making a deep well, or hollow place, that I might have water continually by me, which I brought to perfection in this manner: I took a piece of wood, and pitched upon a place under a burton tree, where, with my hands and the stick together, I dug a hole, or well, big enough to contain a hoghead of water; then I put in stones and paved it, and got in and stamped them down hard all round, and, with my sticks, beat the sides close, so that I made it capable of holding water. But the difficulty was how to get the water there, which I at length effected by means of a sort of bucket made from a part of my clothing. I now felt greatly cheered with my prospects, and thought I should not be very badly off for a while; for besides the water for my drink, I had ready broiled forty boobies, designing to allow myself half a one a-day. I had a small Ovid, printed by Elzevir, which was in my trousers pocket when I was going up the ladder of ropes; and, by being pressed close, was not quite spoiled, but only the cover off, and a little stained with the wet. This was a great mitigation of my misfortune; for I could entertain myself with this book under a burton bush, till I fell asleep. I remained always in good health, only a little troubled with the headache, for want of a hat, which I lost in the water, in falling down from the ladder of ropes. But I remedied this as well as I could, by gathering a parcel of chicken-weed, which grows there in plenty, and strewing it over the burton bushes under which I sat. Nay, at last, finding my time might be longer there than I expected, I tore off one of the sleeves of my shirt, and lined a cap that I had made of green sprigs, twisted with the green bark that I peeled off.

I had been here a month by my reckoning, and in that time my skin looked as if it had been rubbed over with walnut shells. I several times thought to have swam to one of the other islands; but as they looked only like heaps of sand, I believed I had got the best birth, so contented myself with my present station. Of boobies I could get enough, who built on the ground, and another bird, that lays eggs, which I used to eat, but I never ventured to taste the eggs. I was so well satisfied with my boobies, that I did not care to try experiments. The island which I was upon, seemed to me to be about two miles in circumference, and was almost round. On the west side there is a good anchoring-place, for the water is very deep within two fathoms of the shore. God forgive me! but I often wished to have had companions in my misfortune, and hoped every day either to have seen some vessel come that way, or a wreck, where, perhaps, I might have found some necessities which I wanted. I

used to fancy, that if I should be forced to stay there long, I should forget my speech; so I used to talk aloud, ask myself questions, and answer them. But if any body had been by to have heard me, they would certainly have thought me bewitched, I often asked myself such odd questions. All this while I could not inform myself where I was, nor how near any inhabited place.

One morning, which I took to be the 8th of November, a violent storm arose, which continued till noon. In the mean time, I discerned a bark labouring with the waves for several hours; and at last, with the violence of the tempest, perfectly thrown out of the water upon the shore, within a quarter of a mile from the place where I observed them. I ran to see if there were any body I could assist, when I found four men (being all there were in the vessel) busy about saving what they could. When I came up with them, and hailed them in English, they seemed mightily surprised: they asked me "how I came there, and how long I had been there?" When I told them my story, they were concerned for themselves as well as for me, for they found there was no possibility of getting their bark off the sands, the wind having forced her so far: with that we began to bemoan one another's misfortunes; but I must confess to you, without lying, I was never more rejoiced in my whole life, for they had on board plenty of every thing for a twelvemonth, and not an article spoiled. Their lading (which was log-wood) they had thrown overboard to lighten the ship, which was the occasion of the wind forcing her so far. Had they kept in their lading, they would have bulged in the sands, half a quarter of a mile from the place where they did; and the sea, flying over them, would not only have spoiled their provisions, but perhaps have been the death of them all. By these men I understood to what place I had got, namely, one of the islands of Aleranes, which are five islands, or rather large banks of sand, for there is not a tree or bush upon any but that where we were. They lie in the latitude of twenty-two degrees north, twenty-five leagues from Yucatan, and about sixty from Campeachy town. We worked as fast as we could, and got at every thing that would be useful to us before night. We had six barrels of salt beef, three of pork, two of biscuit, a small copper and iron pot, several wearing clothes, and a spare hat, which I wanted mightily. We had, besides, several cags of rum, and one of brandy, and a chest of sugar, with many other things of use, some gunpowder and one fowling-piece. We took off the sails from the yards, and, with some pieces of timber, raised a hut big enough to hold twenty men, under which we put their beds that we got from the bark. It is true we had no shelter from the wind, for the trees were so low they were of no use. I now thought myself in a palace, and was as merry as if I had been at Jamaica, or even at home in my own country. In short, when we had been there some time, we began to be very easy, and to wait contentedly till providence should fetch us out of this island. The bark lay upon the sands, fifty yards from the water, when at the highest, so that I used to lie in her cabin, by reason there were no more beds ashore, than were for my four companions, to wit, Thomas Randal of Cork, in Ireland, whose bed was largest, which he did me the favour to spare a part of, now and then, when the wind was high, and I did not care to lie on board; Richard White, William Musgrave of Kingston, in Jamaica, and Ralph Middleton of Cowes, in the Isle of Wight. These men, with eight others, set out of Port Royal about a month after us, bound for the same place; but the latter, lying ashore, and wandering too far up the country, were met, as it is supposed, by some Spaniards and Indians, who set upon them in great numbers. Yet, nevertheless, by all appearance, they fought desperately; for, when Mr Randal and Mr Middleton went to seek for them, they found all the eight dead, with fifteen Indians, and two Spaniards. All the Englishmen had several cuts in their heads, arms, breasts, &c. that made it very plainly appear they had sold their lives dearly. They were too far up in the country to bring down their dead, so they were obliged to dig a hole in the earth, and put them in as they lay, in their clothes. As for the Indians and Spaniards, they stripped them, and left them above ground as they found them, and made all the haste they could to embark, for fear of any other unlucky accident that might happen. They set sail as soon as ever they came on board, and made the best of their way for Jamaica, till they were overtaken by the storm that shipwrecked them on Make Shift Island, as I had named it.

Now, we had all manner of fishing-tackle with us, but we wanted a boat to go a little way from shore to catch fish; therefore we set our wits to work, in order to make some manner of float, and at last we pitched upon this odd project: we took six casks, and tarred them all over, then stopped up the bungs with corks, and nailed them close down with a piece of tarred canvas. These six casks we tied together with some of the cordage of the vessel, and upon them we placed the skittles of the deck, and fixed them, and made it so strong, that two men might sit upon them; but for fear a storm should happen, we tied to one end of her a coil or two of small rope, of five hundred fathoms long, which we fixed to a small stake on the shore. Then two of them went out (as for my part I was no fisherman) in order to see what success they should have, but returned with only one nurse, a fish so called, about two feet long, something like a shark, only its skin is very rough, and, when dry, will do the same office as a seal skin. The same, boiled in lemon juice, is the only remedy in the world for the scurvy, by applying pieces of the skin to the calves of your legs, and rubbing your body with some of the liquor once or twice.

We sent out our fishermen the next day again, and they returned with two old wives, and a young shark, about two feet long, which were dressed for dinner, and they proved excellent eating. In the morning following we killed a young seal with our fowling-piece. This we salted, and it ate very well, after lying two or three days in the brine.

We passed our time in this Make Shift Island as well as we could, and invented several games to divert ourselves. One day, when we had been merry, sorrow, as

after grief often happens, stole insensibly on us all. I, as being the youngest, began to reflect on my sad condition, spending my youth on a barren land, without hopes of being ever redeemed. Whereupon, Mr Randal, who was a man of great experience, and had come through many sufferings, gave me considerable comfort in my affliction, both by a narrative of his own mishaps, and by a plan he laid before us of a means of getting off the island. "Mr Falconer, and my fellow sufferers," said he, "but it is you," pointing at me, "that I chiefly address myself, as you seem to despair of a safe removal from this place more than any other. Is not your condition much better now than you could have expected it to be a month ago? There is a virtue in manly suffering; as, to repine, seems to doubt of the all-seeing Power which regulates our actions. Our bark is strong and firm; and, by degrees, I do not doubt, but with time and much labour, to get her into the water again. I have been aboard her this morning, when you were all asleep, and examined her carefully, inside and out, and fancy our liberty may soon be effected. I only wonder we have never thought before of clearing the sand from our vessel, which, once done, I believe we may launch her out into deep water."

Having spent the night in reflection on what had passed, the next morning we went to work to clear the sand from our vessel, which we continued working on for sixteen days together, resting only on Sunday, which at last we effected. The next thing we had to do was to get poles to put under our vessel to launch her out; which we got from the burton wood, but with much difficulty, as we were forced to cut a great many, before we could get them that were fit for our purpose. After we had done this, we returned God thanks for our success hitherto; and, on the day following, resolved to thrust off our vessel into the water, but we were prevented by Mr Randal being taken ill of a fever, occasioned, as we supposed, by his great fatigue in working to free our ship from the sand, wherein he spared no pains to encourage us, as much by his actions as his words, even beyond his strength. The concern we were all in upon this, occasioned our delay in not getting our vessel out. Besides, one hand out of five was a weakening of our strength. Mr Randal never thought of his instruments till now, when he wanted to let himself blood; but not feeling them about his clothes, we supposed they might have been overlooked in the vessel: so I ran immediately to see if I could find them; and, getting up the side, my very weight pulled her down to the sand, which had certainly bruised me to death if I had not sunk into the hollow that we had made by throwing the sand from the ship. I crept out in a great fright, and ran to my companions, who, with much ado, got her upright; and afterwards we fixed some spare oars on each side to keep her up from falling again, for the pieces of wood that were placed under her were greased, to facilitate her slipping into the water, and we had dug the sand so entirely from her, that she rested only on them, which occasioned her leaning to one side with my weight only. When we were entered into the vessel, and our endeavours to find the box of instruments were fruitless, we were all mightily concerned, for we verily believed that bleeding would have cured him; nay, even he himself said, that if he could be let blood, he was certain his fever would abate, and he should be easier; yet to see with what a perfect resignation he submitted to the will of heaven, would have inspired one with a true knowledge of the state good men enjoy after a dissolution from this painful life. He grew still worse and worse, but yet so patient in his sufferings, that it perfectly amazed us all. He continued in this manner a whole week, at the end of which time he expired. After our sorrow for his death was something abated, we consulted how to bury him, and at last agreed on committing his body to the hole in the sand which I had dug for my well. After fulfilling this melancholy duty, the whole of our thoughts were bent on our vessel, and the means of escape from the island. The narrative of what was effected, must however remain to be told in the Second Part of my Adventures.

THE ART OF LISTENING.

We have had many treatises on the art of speaking; we now want one on the art of listening. "Strike, but listen," said a celebrated Grecian. Not to listen, or to listen with a want of attention, is an offence against the laws of politeness, and high-treason against society. Conversation is a species of commerce, where every one has a right to bring and to dispose of his commodities, his merchandise, and to supply others with that which he supposes they stand in need of; therefore, it ought to be an exchange, a barter; if not, it becomes an exclusive monopoly; and those who wish to talk, without listening to others, are forestallers, monopolisers, and retailers, who produce stagnation and scarcity.

The Duchess of Maine used to say, "I love conversation; every body listens to me, and I listen to no one." This was also the case with the Abbé Salliani, who was so famous for his anecdotes, and told them so well, that people went to Paris to hear the Abbé Salliani talk as they went to see a new play. But when he had finished his stories, that he might not attend to the observations and remarks, nor hear others speak, he mixed with the crowd and disappeared. These persons knew how to talk, but not how to converse.

If to listen, and to listen properly, is a duty towards others, it is also of the greatest utility and importance to ourselves. He who possesses no talent, but that of paying attention and gathering gracefully and judiciously the words of others, will become more agreeable and esteemed than even if he possessed superior merit. We discover sense in those who admire our own talents, and are satisfied with others when we are self-satisfied. Complaisance in listening marks a

wish to learn: he who does not love to listen, does not wish to learn the truth. *He who speaks, sows; he who listens, reaps.* We cannot always shine, but we may make others shine; and profiting thus by the wisdom of others, we make their learning our own. In conversation, better than in books, we gather the flowers of science; and a beautiful discourse makes more impression on the heart and the mind than the finest writing. "Where did you acquire those beautiful ideas?" said a sultan to the beautiful Roxana. "From my own heart," said the favourite. "I have read them in some book." "Perhaps the author and I have hit upon the same thought." "The ideas are the same, but you put them in such beautiful language that they give me double pleasure." "That is, because now you are listening to me, and then you were reading."

If listening is the way to instruct ourselves, it is also a sign and proof of a cultivated mind. The Abbé Trublet said, that he had a better opinion of the sense of a person who could take up with wisdom and sagacity a witty speech, or a noble thought, than of him who first suggested it. The latter is often the effect of chance, the former requires a solid foundation of taste and understanding.

Nothing is more acceptable and pleasing than the art of listening. An old man left a large legacy to a man who was not his relation, because he had had the complaisance to listen to him. We therefore love the company of those who listen willingly to us, and we often see men of superior abilities prefer the society of those whose talents are inferior, because they listen with respect, and studiously gather every word that falls from them. This does not originate in pride or vanity; but the superiority of others oppresses the mind and destroys the courage; perfect equality occasions a rivalry of pretensions and disputes; but to sit in judgment, to be looked up to as an oracle, give a freedom of mind, a facility, a strength, a boldness, favourable to the development of genius, the rapidity of thought, the brilliancy of language. The mind is raised and inflamed by awakening delight and curiosity. No one, on the contrary, is so displeasing and offensive, as he who refuses his attention, or who listens with a total want of respect and politeness. He listens with contempt, impatience, dislike, or pity; smiles sarcastically, shuts his eyes, yawns, and goes to sleep while you are speaking. Some understand slowly; they say, "Explain yourself better; he who understands you must be clever; either I cannot comprehend you, or you cannot explain yourself." Others, on the contrary, as soon as you open your mouth, pretend to know what you would say, and appear impatient till you are done. Some take the words out of your mouth, contradict you sharply, and correct you in a dogmatical manner. "Excuse me," they say politely; "I hear you are not fully informed on this subject." Others, whilst you are in the heat of your discourse, begin to talk to some person, call the servants, scold the children, or perhaps turn their backs and leave you. An eastern sage was relating his misfortunes to a statue; "Fool," said a traveller, "do you suppose that cold marble hears you?" The sage replied, "I know the marble hears me not, but at least it does not interrupt me." Fontenelle in his old age said, that he willingly left the world, since there was no one in it who knew how to listen to him.

I acknowledge that it is a punishment to be obliged to listen to the empty and absurd discourse of many tiresome persons and foolish chatters. A man complained, that nature had not furnished our ears with a species of valve, by which we might shut out the words of the idle and importunate, as we close our eyes at the sight of an object which displeases or dazzles us; but he forgot that in society we could not make use of it, since society obliges us to listen reciprocally, as it also prevents us from shutting our eyes and going to sleep.

Dean Swift thus explains the reason why we pay so little attention to others when they are speaking. It originates in the wish and anxiety of expressing an idea that has occurred to us, while another is speaking; wishing for an opportunity, we do not think of what others are saying, but of what we mean to say ourselves; and the imagination is occupied with its own productions. Our wandering eyes seem to seek something, as if we feared our memories might prove treacherous, and that we should lose an opportunity of making a remark that would do us infinite credit; we fear that a new idea should escape us, and that another less striking should take its place. What is the consequence? It destroys invention, novelty, originality, simplicity, and beauty of language, which are the light and ornament of conversation, and form the pleasure of society. We lose many thoughts, newer, more natural, and more spirited, which might be prompted by the discourse of our antagonist, by the energy of his arguments, or the truth of his facts.

There is a proper way of listening; not that of the stupid and ignorant, who, at every trifling word, open their eyes and cry out a miracle; nor that of those who smile and applaud as soon as you begin to speak. They resemble some persons who would applaud at the theatre as soon as the candles are lighted. We feel much surprised and mortified, when, imagining we have deserved the applause of a discerning auditor, a stupid exclamation or a silly observation proves to us that we have been talking to a fool. Neither do we love the ill-judged silence of blind approbation. It is a stupid pleasure, says Montaigne, to live with

those who always admire and yield to us. We must esteem those who admire us, in order to aspire to their praises, and to acquire in their company the fire of eloquence and the desire to please.

We require a little attention, a few judicious observations, a slight opposition sometimes to excite the mind and the genius, to enable us to bring forward our most powerful arguments, and to give the conversation more interest and sprightliness.

Our company becomes interesting as we become interested; we are pleased when we listen as we ought. I call listening properly, appearing to observe, to approve, and to be pleased; a sensible remark, a just applause, a delicate compliment, a few words apparently suggested by those of others, a single word introduced with propriety; and even without that, an intelligent and animated look, a smile of praise and approbation; in short, that air of attention, of interest, of internal satisfaction, of esteem, of affection, which is the first and greatest compliment we can pay to any person, forms the highest delight of polished society, and is the great art of men of the world and of good taste.

But the perfection of listening is to make others talk: this is accomplished by turning the discourse to the subject they like and understand the best. It is the proper method of making them talk well, of pleasing ourselves, and of profiting by their conversation. Buffon, being asked if such a person was a man of sense and wit, replied, that he had never discovered a single animal. Madame Geoffrin was asked how she could bear the conversation of a very tiresome man for three hours. She replied, "I made him talk of himself and of his affairs; and, in talking of what interests ourselves, we become interesting to others." A lady said to the Abbé de St Pierre, "You have been delightful to-day: you have said many witty things." "I," replied he, "am only an instrument; you have played upon it according to your own taste, and you knew how to sound it."

ANECDOTES OF THE ORIGIN OF WORDS. SEVENTH ARTICLE.

THE origin of the word *Fairy* has been the subject of much doubt and dispute. Some of the early philologists derived the term from the Greek word *pheres*, signifying Centaurs; but except in so far as the Centaurs were supernatural beings—being a sort of half-horses, half-men—there seems to be no imaginable connection or resemblance between *pheres* and fairies. Other etymologists went to the Hebrew, others to the Saxon, and others to the Celtic, for the root of the word fairy, but none of these languages yielded any thing like a satisfactory explanation of the point under consideration. At length some lucky mediator thought of the Persian word *Peri*, which signifies a supernatural personage not unlike the fairy in character, and he founded on this a theory, long regarded as perfectly unobjectionable and decisive. The Paynim foe, according to this theory, whom the warriors of the cross encountered in Palestine, spoke only Arabic; the alphabet of which language, it is well known, possesses no *p*, and therefore habitually substitutes an *f* in such foreign words as contain the former letter; consequently, the Arabs, in adopting *Peri* from the Persian, converted it to *Feri*, whence the crusaders and pilgrims, who carried back to Europe the marvellous tales of Asia, introduced into the lands of the west the word *Faerie*, *Faery*, or *Fairy*. Unluckily some one took it into his head to remember, after the theory had reigned absolute for a time, that the original word signifying the being called a fairy was *Fay*, and that *faerie*, when first used, meant the land of the *fays*, and sometimes the illusions or glamoury in which they dealt. Chaucer always uses the word in one or other of these two senses. Thus, in the Squire's Tale, it is used to signify the land of the fays:—

"That Gawain with his old curtesio,
Though he were come agen out of *faerie*."

And, in the Merchant's Tale, in the sense of enchantment:—

"Her to behold it seemed *faerie*."

Fay, then, being the original word, what resemblance is there between it and the Persian *Peri*? Why, every letter is taken away on which the similarity was founded; or if we admit the story of the Arabic version of the word, *F* is the initial letter of each; but here all likeness stops, as in the case of pilus and peruke, which old Menage has endured so much ridicule about. The truth of the matter—and it is time to come to it—seems to be, that the Latin word *Fata*, classically signifying the three sisters called the Fates, is the source of the terms *fay* and *fairy*. One thing which almost puts the point beyond dispute, is, that the Italian word for fairies at this day is *fata*, and the Spanish *fada*. The change to *fay* and *faerie* appears to have been effected in the early French tongue, where the verb *faer*, to enchant, occurs, founded on the obsolete Latin verb *fatare*, with the same meaning, taken from *fata*. From *faer* sprang *fay* and *fairy*, in all probability. The character of the sisters, called the Fates, according to the heathen mythology, was in

some respects not unlike that assigned to fairies. The Fates presided over the births of mortals, and this, by all accounts, was one of the great employments of fairies. In many points, however, their attributes were certainly very dissimilar, but the connection of their names is too strong to be shaken by this.

Peculiar, as it ought to be, is a singular word. *Pecu*, a Latin term, denotes a flock, and from it comes the diminutive *peculium*, a little flock. Now, the slaves who herded the cattle of farmers in ancient days received a small stock as their fee, exactly as the Scottish shepherds of the present day are remunerated, in part at least, for their services. The slave's little stock, or *peculium*, gave origin to the adjective *peculiaris*, translated into English by the word *peculiar*, signifying any thing strictly and undeniably one's own, as apart from the property of others. No doubt, the term had reference at first only to cattle, but ultimately it extended to possessions of every kind. The word *Inculcate*, in its ordinary acceptation, implies to instil—to "impress" any thing upon the mind. A teacher is told by parents to "inculcate" such and such good lessons upon the minds of their hopeful offspring. Little do the parents in general know, that, in using this language, they are, etymologically speaking, bidding the preceptor "stamp in with his heel" the said lessons upon the skull of young master. Such is the true meaning of *inculcate*. It springs from *calx*, the heel, or rather from the derivative verb *calco*, to stamp or kick, and *in*, into; a very pithy etymology, indeed, it must be allowed. *Anguish* is a word not unlike the preceding in the character of its origin. It arises, or, to speak more properly, its Latin prototype *angor* arises, according to the received acceptation, from *anguis*, the Latin word for a snake, to the sinuous twistings of which, the writhings of a person enduring mental or bodily anguish may be fitly compared. The word *Date*, as date of a letter, is a remarkable testimony to the prevalence of the practice of writing all documents in Latin, at one period, throughout Britain. Missives of every kind used to have the word *Datum* attached to them. Thus, a letter from Edinburgh had "*Datum Edinburgh*" (given at Edinburgh) either at the beginning or end, with the period of writing annexed. The foundation of the English word *date*, upon *datum* thus used, is natural and obvious. *Datum*, or rather its plural, *data*, has been almost transplanted into our language. *Datum*, a thing given, *data*, things given, are terms used in argumentation to denote those fundamental points upon which all parties are agreed.

Abolish has a striking etymology. Every one knows that in removing many substances, and particularly certain odorous ones, from any spot, it is comparatively easy to remove their substantial bulk, but sometimes very difficult to root out their smell. The word *abolish* seems to have been formed with an eye to this natural truth. It comes from *oleo*, to smell (to yield a scent), and *ab*, from; and seems to signify a thorough rooting out, leaving not even the odour behind. The received etymology of *Dismal* is extremely expressive. The word is compounded of two Latin ones; *dies*, a day, and *malus*, evil, bad. So that the original meaning of *dismal* is "an evil (or unhappy) day." We must confess that there is something forced-looking in this derivation, but Dr Johnson gives his sanction to it, and certainly no better one has yet been brought forward. The word *Client* is now employed solely as a legal term, denoting the employer of an advocate or lawyer. *Client* is derived from the Latin *cliens*, a term connected with a remarkable custom among the people of Rome. Romulus, the founder of that city and state, in order that his nobles (patricians) and plebeians might be connected by the strictest bonds, ordained that every plebeian should choose from the patricians any one he pleased as his patron or protector, whose client he was called (from the word *colens*, cultivating, because he cultivated the good graces of the patron). It was the part of the patron to advise and to defend his client, to assist him with his interest and substance, and, in short, to do every thing for him that a parent uses to do for his children. The client was obliged to pay all kind of respect to the patron, and to serve him with life and fortune in any extremity. The laws did not permit patrons and clients to bear witness against one another, and whoever was found to have done so, might be slain by any one with impunity. It was considered the greatest disgrace to have broken any of these obligations, but it rarely happened that they were broken. The connection between patron and client gave rise to one of the most striking features of social life in Rome. Clients, at least those who had immediate reasons for such attendance, used to go at an early hour to pay their morning respects at the houses of their patrons, and thus every popular noble's door presented the spectacle of a great besieging crowd, long before the inmate of the mansion had left his pillow. The more numerous the clients, the greater the honour which accrued to the patron. As nobles followed the profession of the law in Rome, it was natural that those who added great forensic abilities to other qualities, should have special attractions for clients, seeing that they might expect much more benefit from such patrons. Hence, probably, the gradual assumption of its present signification by the word *client*. *Forensic*, by the bye, is a term derived from the Roman *forum*, or market-place, where legal and oratorical talents used to be displayed, in important cases, before the assembly of the people.

Two other words occur to us, *Augury* and *Auspices*, which have been adopted in a limited sense from the language and customs of Rome. The Augur and the Auspex were religious functionaries in that city, holding the character of soothsayers, it being their business to draw omens from the observation of birds. Their names imply this: augur, although curtailed by time and familiar use, being a word compounded of *avis*, a bird, and *gero*, to carry, because it was the duty of the augur to declare the omens, according to the carriage and bearing of birds, as to their flight, feeding, and other particulars. Auspex is compounded in a similar way from *avis*, a bird, and *specio*, to inspect, because it was the occupation of the auspex also, to draw omens from the observation of the feathered race. The difference between these personages was, that the situation of the augur was for life, while the auspex foretold events only in a transitory way. Our words augury and auspices approach in meaning to their roots; augury being nearly synonymous with prediction, and auspices with omens, or favouring superintendence.

Articulation, in the sense of speech, or distinct utterance, has arrived at that signification very curiously. It is traced to *artus*, the Latin for a limb, and from this came articulation in the sense of a joint, or juncture of bones in a limb. To give distinct utterance to a word, is to join letters together in a proper and perfect manner, and hence came the application of the word articulation to speech. Other modes of tracing the word to its root have been suggested, but this seems the most clear and feasible. A very acute and observant personage, well worthy to be the founder of a language, must have been the inventor of the word *Supercilious*. It is based upon an act by which pride or haughtiness is ever to be known. *Supercilious* is compounded of *super*, above, and *cilium*, the eye-lash, and was used in its present sense, because the eye-brow—the *supercilium*, or place above the eye-lash—is the feature which most commonly expresses haughtiness, by its elevation and movements generally. *Terrier* is the next term that suggests itself to us. Its origin is very appropriate, seeing that it comes from *terra*, the earth, in the holes of which dogs of this species hunt badgers and other game or prey. The word *Policy* is remarkable for being a triple word; that is to say, it has three distinct senses, and two, if not three, distinct roots. It signifies the art of government, and in this meaning is derived from the Greek *polis*, a city, being first used in the sense of civic government. *Policy*, again, as applied to an act or deed of insurance, springs from the Latin verb *pollicio*, to promise. And, lastly, *policy* (though in this third sense it may be called a Scotticism), when used to denote the ornamental walks and grounds around a gentleman's property, seems to have a nearer connection with *polio*, to polish, than with any other root.

We have had so much classical matter before us in this article, that we now feel desirous of recreating our readers and ourselves with something of a more familiar order. And to commence—what may be the origin of the term *Pot-walloper*, as designating the ancient electors in the English boroughs? Most old politicians will be able, we believe, to answer this, but, for the benefit of juveniles, we shall give an explanation. In former days, all persons had a right to vote at a parliamentary election who boiled their *pots* in the borough. This was an unexceptionable test of house-holding. As for the *walloping*, it referred to the movements of the meat in a boiling pot, and hence the term *pot-walloper*.

Apothecary is said by classical etymologists to be compounded of *apo* and *themi*, two Greek words signifying to put away from, to dispose of, and indicating merely sellers or merchants. This may very probably be correct, especially as the apothecaries have always had some pretensions to be a learned body, and might invent for themselves a learned name. The word *Laboratory*, which is sometimes applied to the shop of an apothecary or druggist, is more certainly defined in its origin. In former times, the persons who manufactured and dealt in drugs were practical chemists, whose workshops were entitled *laboratories*, from the Latin word for labour. In time, the term laboratory was extended to the mere shop in which drugs were sold, without any reference to the labouring or working of the dealers. The dread personages called *Duns*, or seekers of money from debtors, received this appellation in the times when the Norman-French was spoken extensively in this country. The first word used by claimants for money in those days was naturally *donnes* (give), and this circumstance, it is thought, entailed the name of duns or duns upon all individuals in such a position. Some say, however, that the word sprang from one John Dunn, a sheriff officer of Lincoln, who was so dexterous in bringing debtors to their marrow-bones, that people at last used to say, one to another, in cases of dilatory payment, "Why don't you set Dunn at him?—why don't you dunn him?" Which became proverbial (says this account) as far back as the times of Henry VII.

We shall conclude our present article on words with an explanation of a point which possibly may, at one time or other, have excited a little speculation in the minds of some of our readers. Why did the apostle Paul change his name from Saul, at the period of his conversion? Because he wished to denote that he was the least, or meanest, of all the apostles; the name of Paul being derived from *paulus*, little. This seems a very rational interpretation of the matter.

* The above paper appeared some years ago in the *Kaleidoscope* as a translation from an Italian periodical work published in London, under the title of the *Italice*.

CONTRIVANCES OF ANIMALS.

I BELIEVE no person who has, without prejudice, studied the character and habits of the living creatures below him, will find it easy to deny them at least some glimpses of that higher faculty to which his own species has the most appropriate claim. A few well-authenticated instances will illustrate this remark. I have the following anecdote from a gentleman of undoubted veracity, and acute observation, in the vicinity of Dumfries. A few years ago this gentleman had beautified his residence, by converting a morass in its neighbourhood into an extensive piece of water, which he had stocked with fish; and, as places of retreat for these tenants of his lake, he had caused numerous roots of trees to be thrown in here and there, which were usually hid below the surface. This year (1836), however, the unusually dry spring caused the necessary supply of water unexpectedly to fail, and the pond sank so low, that some of the roots made their appearance, and on one of these, more elevated than the others, a pair of wild ducks constructed their infartificial nest, and the female had already laid some eggs, when the weather changed, and the descending rains having filled the streams by which the lake was fed, the surface gradually rose, and threatened to overwhelm the labours of this luckless pair, and to send their eggs adrift on the swelling waves. Here instinct had no resource. It was an unexpected occurrence, for which this faculty could not provide; but if any glimmerings of reason belonged to these fond parents, it might be expected to be exerted. And so it was. Both the duck and the drake were observed to be busily employed in collecting and depositing materials; presently the nest, which the rising waters had already reached, was seen to emerge as it were from the flood; more and more straw and grass were added, till several inches of new elevation was gained, and the nest, with its precious contents, appeared to be secure. Here the fond mother patiently brooded her full time, and one duckling rewarded her care; when, just as it had escaped from the shell, another torrent of rain fell, more sudden and more violent than the first; the water rose higher and higher; the nest and remaining eggs were swept away. In this emergency, the whole attention of the parents was given to the living progeny, which was safely conveyed by them to the shore, where another nest was constructed; and their sagacity and solicitude were finally crowned with success.

In some of the insect tribes, there seems to be an extraordinary faculty, which, if it can be called instinct, surely approaches to the highest faculty possessed by man—I mean the power of communicating information by some natural language. Huber affirms, "that nature has given to ants a language of communication, by the contact of their antennæ; and that, with these organs, they are enabled to render mutual assistance in their labours and in their dangers, discover again their route when they have lost it, and make each other acquainted with their necessities." This power seems to be confirmed by what occurred to Dr Franklin. Upon discovering a number of ants regaling themselves with some treacle in one of his cupboards, he put them to the rout, and then suspended the pot of treacle by a string from the ceiling. He imagined that he had put the whole army to flight, but was surprised to see a single ant quit the pot, climb up the string, cross the ceiling, and regain its nest. In less than half an hour, several of its companions sallied forth, traversed the ceiling, and reached the repository, which they constantly revisited, till the treacle was consumed. The same power of communication belongs also to bees and wasps; as may be proved by any one who carefully attends to their habits. This is their language, not of articulate sounds, indeed, but of signs—a language which, as Jesse observes, "we can have no doubt is perfectly suited to them—adding, we know not how much, to their happiness and enjoyments, and furnishing another proof that there is a God all-mighty, all-wise, and all-good, who has 'ornamented the universe' with so many objects of delightful contemplation, that we may see him in all his works, and learn not only to fear him for his power, but to love him for the care which he takes of us, and of all his created beings." Whether this power of communication be rational or instinctive, it is obviously only suited to be useful to a being possessed, at least to a certain extent, of intellectual faculties—of the power of forming designs—of combining, with others, to execute them—of accommodating itself to circumstances, and, therefore, of remembering, of comparing, of judging, and of resolving. These are assuredly acts of reasoning; at least I know not under what other category to arrange them.

The instance which Dr Darwin gives of a wasp, noticed by himself, is in point. As he was walking one day in his garden, he perceived a wasp upon the gravel walk, with a large fly, nearly as big as itself, which it had caught. Kneeling down, he distinctly saw it cut off the head and abdomen, and then, taking up with its feet the trunk, or middle portion of the body, to which the wings remained attached, fly away; but a breeze of wind, acting on the wings of the fly, turned round the wasp, with its burden, and impeded its progress. Upon this, it alighted again on the gravel walk, deliberately sawed off, first one wing, and then another, and having thus removed the cause of its embarrassment, flew off with its booty. Here we have contrivance, and re-contrivance; a resolution accommodated to the case, judiciously formed and executed, and, on the discovery of a new impediment, a new plan adopted, by which final success was obtained. There is, undoubtedly, something more than instinct in all this. And yet we call the wasp a despicable and hateful insect!—*Duncan's Sacred Philosophy of the Seasons.*

DUNLOP CHEESE.

In the parish of Dunlop, Ayrshire, the dairy has long been the chief object of attention. Dunlop cheese has justly obtained a very high character. The cheese made here, as well as in other parts of the country, was made of skimmed milk, till about the end of the seventeenth century, when one Barbara Gilmour introduced the practice of using the whole milk. This prac-

tice for a time was confined to this parish and its immediate neighbourhood, but it has gradually extended to almost every part of the west and south of Scotland. All the cheese made in these districts, with unskimmed milk, still goes under the general name of *Dunlop*, that being the name by which cheese of this quality was originally known. It is not now pretended that what is made here is superior to that of other places, but it is nowhere excelled.—*New Statistical Account of Scotland.*

W O M A N.

In infancy, from woman's breast,
We draw the food by Nature given;
She lulls our childish pangs to rest,
And cheers us with a beam from heaven!
When woman smiles, she has the power
To heal our grief, and calm our fears;
Should sickness wound, should fortune lour,
She shares our sorrows, dries our tears.
And she can soothe the cares of age,
As rolls time's furrowing course along;
Can cheer us with the classic page,
Or charm us with the magic song.
When stretched upon the bed of death,
Departing nature struggling lies,
At that dread pause—when the next breath
May waft our spirit to the skies;
When the soul views the narrow verge,
Close on the confines of the grave,
And now it longs its flight to urge—
Nor wishes for an arm to save.
Who cheers that dreary scene of woe?
Who speaks of peace, and joy, and love?
Who wipes the tear-drops as they flow?
'Tis woman, sent from heaven above.
'Tis she receives our parting sigh,
'Tis she who hears our latest breath,
'Tis she who seals the closing eye,
And whispers peace and hope in death!
And when the mournful scene is past,
'Tis woman weeps upon our bier;
Silent, yet long, her sorrows last,
Unseen she sheds affection's tear.
On earth she is the truest friend
That is to man in mercy given;
And when this fleeting life shall end,
She'll live for purer bliss in heaven.
Oh, woman! woman! thou wert made,
Like heaven's own pure and lovely light,
To cheer life's dark and desert shade,
And guide man's erring footsteps right.
—*American Paper.*

MODES OF SALUTATION IN VARIOUS COUNTRIES.

WHEN men salute each other in an amicable way, it signifies little whether they move a particular part of the body, or practise a particular ceremony. In these actions there must exist different customs. Every nation imagines it employs the most reasonable ones; but all are equally simple, and none are to be treated as ridiculous.

This infinite number of ceremonies may be reduced to two kinds, to reverences or salutations, and to the touch of some part of the human body. To bend and prostrate one's self to express sentiments of respect, appears to be a natural motion; for terrified persons throw themselves on the earth when they adore invisible beings, and the affectionate touch of the person they salute is an expression of tenderness.

As nations decline from their ancient simplicity, much farce and grimace are introduced. Superstition, the manners of a people, and their situation, influence the modes of salutation, as may be observed from the instances we collect.

Modes of salutation, in general, are similar in the infancy of nations, and in more polished societies. Respect, incivility, fear, and esteem, are expressed much in a similar manner; these demonstrations, however, become in time only empty civilities, which signify nothing.

The first nations have no peculiar modes of salutation; they know no reverences or other compliments, or they despise them. The Greenlanders laugh when they see an European uncover his head, and bend his body before him whom he calls his superior.

The inhabitants of the Philippine isles take the hand or foot of him they salute, and with it they gently rub their face. The Laplanders apply their nose strongly against that of the person they salute. At New Guinea they put on their hands the leaves of trees, which have ever passed for symbols of friendship and peace. This is at least a picturesque salute.

Other salutations are very incommodious and painful; it requires much dexterity and practice to be polite in an island situated in the Sound. Ventman tells us they saluted him in this grotesque manner: they raised his left foot, which they passed gently over the right leg, and from thence over his face. The inhabitants of the Philippines bend their bodies low, place their hands on their cheeks, and raise at the same time one foot in the air with their knee bent.

An Ethiopian takes the robe of another, and ties it about his own waist, leaving his friend half naked. Sometimes men place themselves naked before the person they salute, to show their humility and unworthiness to appear in his presence. This was done before Sir Joseph Banks, when he received the visit of two female Otahitians. The Japanese only take off a slipper; the people of Arracan their sandals in the street, and their stockings in the house.

In progress of time, it appears servile to uncover one's self. The grandees of Spain claim the right of appearing covered before the king, to show that they are not so much subjected to him as the rest of the nation; and we may remark, that the English do not uncover their heads so much as the other nations of Europe. Uncovering the head, with the Turks, is a mark of indecent familiarity; in their mosques, the Franks must keep their hats on.

The Jewish custom of wearing their hats in their synagogues, arises probably from the same Oriental custom.

In a word, there is not a nation (observes the humorous Montaigne), even to the people who, when they salute, turn their backs on their friends, but that can be justified in their customs.

The Negroes love ludicrous actions, hence all their ceremonies seem farcical. The greater part pull the fingers till they crack. When two Negro monarchs visit, they embrace, snapping three times the middle finger.

Barbarous nations frequently imprint on their salutations the dispositions of their character. When the inhabitants of Carmena would show a peculiar mark of esteem, they breathed a vein, and presented for the beverage of their friend the blood as it issued. The Franks tore the hair from their head, and presented it to the person they saluted. One slave cut his hair, and offered it to his master.

The Chinese are singularly affected in their personal civilities. They even calculate the number of their reverences. These are the most remarkable postures:—The men move their hands in an affectionate manner, while they are joined together on the breast, and bow their head a little. If they respect a person, they raise their hands joined, and then bend them to the earth along with the body. If two persons meet after a long separation, they both fall on their knees and bend the face to the earth; this ceremony they repeat two or three times. Surely we may differ here with the sentiments of Montaigne, and confess this ceremony to be ridiculous. It arises from their national affectation. They substitute artificial ceremonies for natural actions.

Marks of honour are frequently arbitrary; to be seated with us, is a mark of repose and familiarity: to stand up, that of respect. There are countries, however, in which princes will only be addressed by persons who are seated, and it is considered as a favour to be permitted to stand in their presence. This custom prevails in despotic countries; a despot cannot suffer without disgust the elevated figure of his subjects; he is pleased to bend their bodies with their genius; his presence must lay those who behold him prostrate on the earth; he desires no eagerness, no attention; he would only inspire terror.—*From a Scrap Book.*

KNOWLEDGE.

The ordinary objection had been made in Dr Johnson's presence to "the general diffusion of knowledge"—that "it will make the vulgar rise above their sphere." But the Colossus of English literature firmly answered, "Sir, while knowledge is a distinction, those who are possessed of it will naturally rise above those who are not. Merely to read and write was a distinction at first, but we see now reading and writing have become general, the common people keep their stations. And so, were the highest attainments to become general, the effect would be the same."—*Old Scrap Book.*

HOW TO SLEEP IN SNOW.

The manner in which Captain Ross's crew preserved themselves after the shipwreck of their vessel, was by digging a trench in the snow when night came on; this trench was covered with canvass, and then with snow; the trench was made large enough to contain seven people; and there were three trenches, with one officer and six men in each. At evening, the shipwrecked mariners got into bags made of double blanketing, which they tied round their necks, and thus prevented their feet escaping into the snow while asleep; they then crept into the trenches and lay close together. The cold felt was generally 64 degrees below the freezing point of Fahrenheit, but in January 1831, the mercury was 92½ degrees below the freezing point.—*Martin's British Colonies.*

TABULAR VIEW OF MUSICAL PROPORTIONS.
In the subjoined table is given a view of the proportions of length of string and number of vibrations in a second, by which the seven notes of music are produced—supposing Do or C to be produced by a string of forty-five inches, making two hundred and forty vibrations in that space of time:—

	Do or C.	Si or B.	La or A.	Sol or G.	Fa or F.	Mi or E.	Re or D.	Do or C.
Proportional length of string	45	36	30	24	20	18	15	45
Length of string in inches	45	36	30	24	20	18	15	45
Proportional number of vibrations	1	1.25	1.5	1.75	2	2.25	2.5	1
Actual number of vibrations	240	300	360	420	480	540	600	240

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